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User's Manual

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Renesas Starter Kit for 38D5

User's Manual

RENESAS SINGLE-CHIP 8-BIT CMOS MICROCOMPUTER
740 FAMILY

Renesas Electronics
www.renesas.com

Rev.2.00 2007.08

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Chapter 1. Preface

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Glossary

ADC	Analog to Digital Converter	IRQ	Interrupt ReQuest
CPU	Central Processing Unit	LCD	Liquid Crystal Display
DAC	Digital to Analog Converter	LED	Light Emitting Diode
E8a	E8a On-chip debugger module	LSI	Large Scale Integration
HEW	High-performance Embedded Workshop	MCU	Microcontroller

Chapter 2. Purpose

This Renesas Starter Kit is an evaluation tool for Renesas microcontrollers.

Features include:

- Renesas Microcontroller Programming.
- User Code Debugging.
- User Circuitry such as Switches, LEDs and potentiometer(s).
- User or Example Application.
- Sample peripheral device initialisation code.

The Renesas Starter Kit board contains all the circuitry required for microcontroller operation.

NOTE: This manual describes the technical details of the Renesas Starter Kit for 38D5 hardware. The Quick Start Guide and Tutorial Manual provide details of the software installation and debugging environment.

Chapter 3. Power Supply

3.1. Requirements

This Renesas Starter Kit operates from a 3V to 5V power supply.

A diode provides reverse polarity protection only if a current limiting power supply is used.

All Renesas Starter Kit boards are supplied with an E8a debugger. This product is able to power the board with up to 300mA. When the Renesas Starter Kit is connected to another system then that system should supply power to the Renesas Starter Kit.

All Renesas Starter Kit boards have an optional centre positive supply connector using a 2.1mm barrel power jack.

Warning

The Renesas Starter Kit is neither under nor over voltage protected. Use a centre positive supply for this board.

3.2. Power – Up Behaviour

When the Renesas Starter Kit is purchased the Renesas Starter Kit board has the 'Release' or stand alone code from the example tutorial code pre-programmed into the Renesas microcontroller. On powering up the board the user LEDs will start to flash. After 200 flashes, or after pressing a switch the LEDs will flash at a rate controlled by the potentiometer.

Chapter 4. Board Layout

4.1. Component Layout

The following diagram shows the top layer component layout of the board.

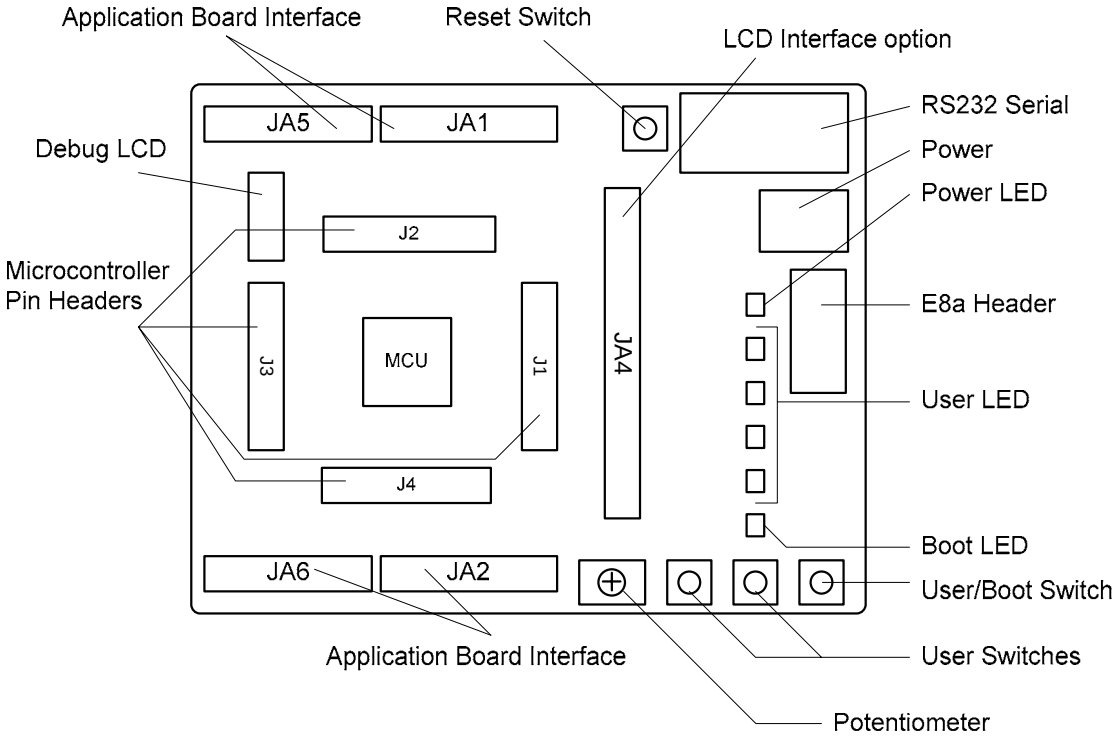


Figure 4-1: Board Layout

4.2. Board Dimensions

The following diagram gives the board dimensions and connector positions. All through hole connectors are on a common 0.1" grid for easy interfacing.

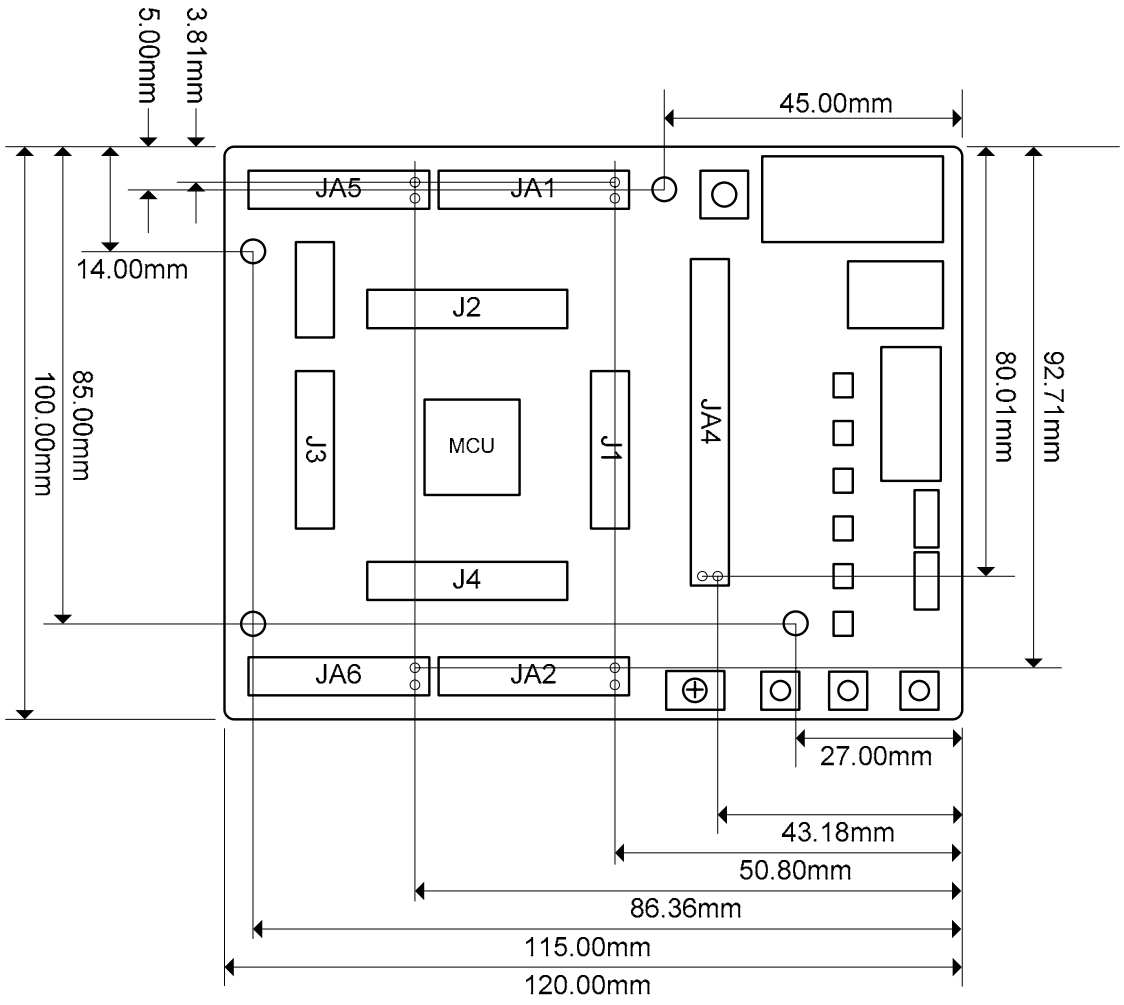


Figure 4-2 : Board Dimensions

Chapter 5. Block Diagram

Figure 5-1 is representative of the CPU board components and their connectivity.

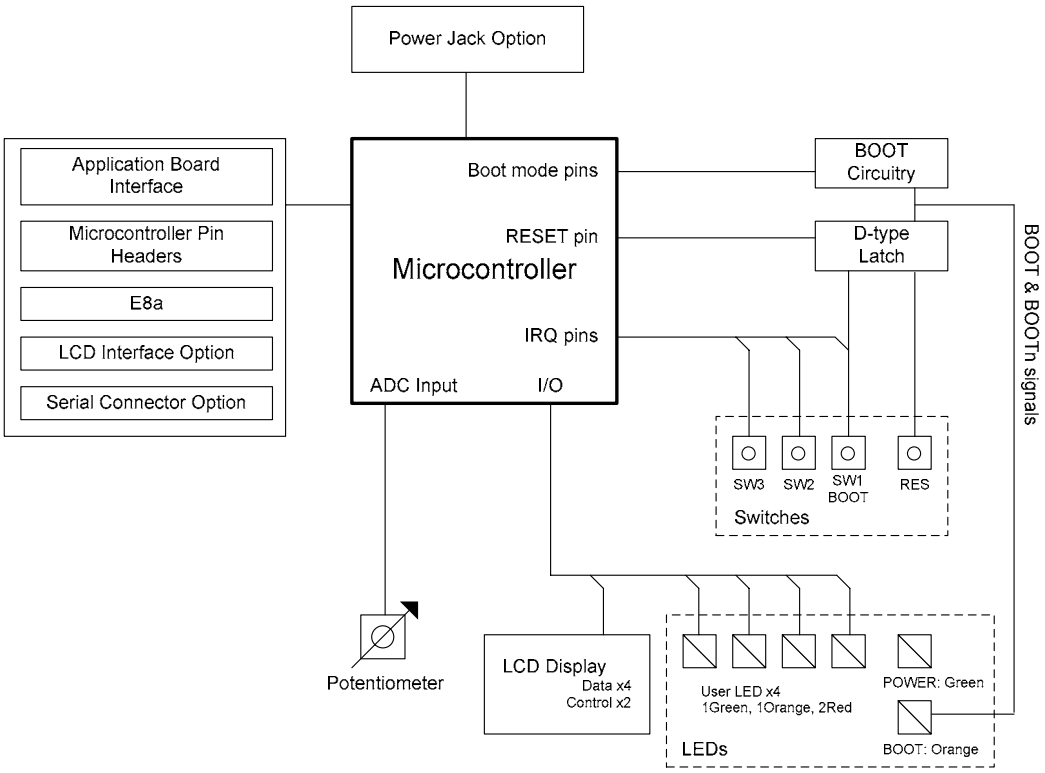


Figure 5-1: Block Diagram

Figure 5-2 is representative of the connections required to the Renesas Starter Kit.

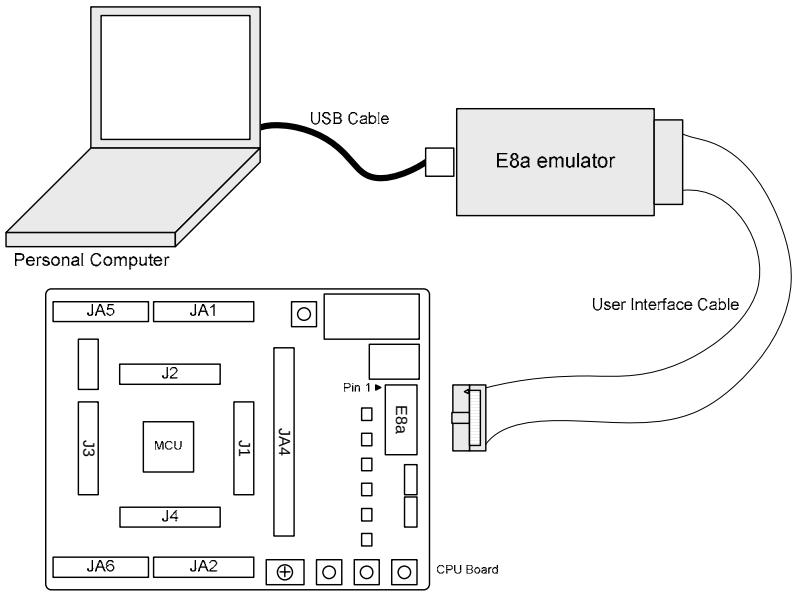


Figure 5-2 : Renesas Starter Kit Connections

Chapter 6. User Circuitry

6.1. Switches

There are four switches located on the board. The function of each switch and its connection are shown in Table 6-1.

Switch	Function	Microcontroller
RES	When pressed, the Renesas Starter Kit microcontroller is reset.	RESET Pin8
SW1/BOOT*	Connects to an IRQ/CNTR input for user controls. The switch is also used in conjunction with the RES switch to place the device in BOOT mode when not using the E8a debugger.	INT1_0/CNTR0 Pin2 (Port 6, pin 6)
SW2*	Connects to a CNTR Interrupt input line for user controls.	CNTR1 Pin1 (Port 6, pin 7)
SW3*	Connects to a KEY input for user controls.	KW4 Pin62 (Port 2, pin 0)

Table 6-1: Switch Functions

*Refer to schematic for detailed connectivity information.

6.2. LEDs

There are six LEDs on the Renesas Starter Kit board. The green 'POWER' LED lights when the board is powered. The orange 'BOOT' LED indicates the device is in BOOT mode when lit. The four user LEDs are connected to an IO port and will light when their corresponding port pin is set low.

Table 6-2, below, shows the LED pin references and their corresponding microcontroller port pin connections.

LED Reference (As shown on silkscreen)	Colour	Microcontroller Port Pin function	Microcontroller Pin Number
LED0	Green	Port 6.2	6
LED1	Orange	Port 6.3	5
LED2	Red	Port 6.4	4
LED3	Red	Port 6.5	3

Table 6-2: LED Port

6.3. Potentiometer

A single turn potentiometer is connected to AN0 (P5.0) of the microcontroller. This may be used to vary the input analog voltage value to this pin between VREF and Ground.

6.4. Serial port

The microcontroller programming serial port is connected to the E8a connector. This serial port can optionally be connected to the RS232 transceiver as well by fitting option resistors. The connections to be fitted are listed in the Table 6-3.

Description	Function	Fit for E8a	Remove for E8a	Fit for RS232	Remove for RS232
TxD	Programming Serial Port	R45	R49	R49	R45
RxD	Programming Serial Port	R43	R47	R47	R43

Table 6-3: Serial Port settings

Other serial port is connected to the application headers.

6.5. LCD Module

An LCD module is supplied to be connected to the connector J8. This should be fitted so that the LCD module lies over J2. Care should be taken to ensure the pins are inserted correctly into J8.The LCD module uses a 4 bit interface to reduce the pin allocation. No contrast control is provided; this is set by a resistor on the supplied display module. The module supplied with the Renesas Starter Kit only supports 5V operation.

Table 6-4 shows the pin allocation and signal names used on this connector.

J8					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	Ground	-	2	5V Only	-
3	No Connection	-	4	LCD_RS	48
5	R/W (Wired to Write only)	-	6	LCD_E	47
7	No Connection	-	8	No Connection	-
9	No Connection	-	10	No Connection	-
11	LCD_D4	42	12	LCD_D5	41
13	LCD_D6	40	14	LCD_D7	39

Table 6-4: LCD Module Connections

6.6.Option Links

Table 6-5 below describes the function of the option links associated with Power configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R20	Board VCC	**Supply to board from DC Power Jack (J5)**	Disconnected	R21
R21	Board VCC	**Connects Board_VCC supply to board voltage line**	Board_VCC disconnected from board voltage line	R20, R22, R23, R24, R25
R22	Board VCC	**Connects External 5V (CON_5V) to Board_VCC**	External 5V disconnected from Board_VCC	R21, R23, R25
R23	Board VCC	Connects External 3V3 (CON_3V3) to Board_VCC	**External 3V3 disconnected from Board_VCC**	R21, R22, R25
R25	Microcontroller VCC	**Supply to microcontroller**	Fit Low ohm resistor to measure current	R21, R22, R23
R33	User I/O Power Supply	**Connects Board_VCC supply to SW2, 3 and LED0-3**	Board_VCC disconnected from SW2, 3 and LED0-3	

Table 6-5: Power Configuration Links

Table 6-6 below describes the function of the option links associated with Clock configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R14	Main Clock Oscillator	**Connects X1 clock to microcontroller**	X1 clock disconnected from microcontroller	R16, R17
R16	Main Clock Oscillator	Connects External Microcontroller header pins to microcontroller	**Disconnects sensitive microcontroller signals from external pins**	R14, R17
R17	Main Clock Oscillator	Connects External Microcontroller header pins to microcontroller	**Disconnects sensitive microcontroller signals from external pins**	R14, R16
R8	Sub Clock Oscillator	**Parallel resistor for X2 clock**	Not fitted	R7, R10
R7	Sub Clock Oscillator	**Connects X2 clock to microcontroller**	X2 clock disconnected from microcontroller	R6, R8, R10, R11
R10	Sub Clock Oscillator	**Connects X2 clock to microcontroller**	X2 clock disconnected from microcontroller	R6, R7, R8, R11
R6	Sub Clock Oscillator	Connects External Microcontroller header pins to microcontroller	**Disconnects sensitive microcontroller signals from external pins**	R7, R10, R11
R11	Sub Clock Oscillator	Connects External Microcontroller header pins to microcontroller	**Disconnects sensitive microcontroller signals from external pins**	R6, R7, R10

Table 6-6: Clock Configuration Links

Table 6-7 below describes the function of the option links associated with Serial configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R47	Programming Serial Port	Connects RS232 port to Programming SCI port	**MUST be removed if R43 or R53 fitted**	R43, R45, R49, R52, R53, R55
R49	Programming Serial Port	Connects RS232 port to Programming SCI port	**MUST be removed if R45 or R52**	R43, R45, R47, R52, R53, R55
R52	RS232 Serial on Application Header	Connects Application Header (RS232TX) to RS232 transceiver	**MUST be removed if R49 fitted**	R53, R55
R53	RS232 Serial on Application Header	Connects Application Header (RS232RX) to RS232 transceiver	**MUST be removed if R47 fitted**	R52, R55
R55	RS232 Transceiver	Disables RS232 Serial Transceiver	**Enables RS232 Serial Transceiver**	R47, R49, R52, R53

Table 6-7: Serial Configuration Links

Table 6-8 below describes the function of the option links associated with Analog configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R5	AD_POT	**Connects AD_POT to AN0**	Disconnected	
R24	Analog Supply	**Connects Board_VCC supply to Reference Voltage supply**	Reference Voltage MUST be provided from external interface	R21, R22, R23

Table 6-8: Analog Configuration Links

Table 6-9 below describes the function of the option links associated LCD Panel configuration. The default configuration in indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R9	LCD Panel	Connects Contrast Adjust (R19) and LCD power source to V3	**Disconnects Contrast Adjust and LCD power source from V3**	R12, R13, R15, R19
R12 R13 R15	LCD Panel	Bias control resistor for V1, V2, V3	**Not fitted**	R9, R19
R19	LCD Panel	Connects Contrast Adjust (Reference parts: CT-6EP series, COPAL ELECTRNICS Corp)	**Not fitted**	R9, R12, R13, R15

Table 6-9: LCD Panel Configuration Links

Table 6-10 below describes the function of the option links associated with other options. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R30	SW1	**Connects SW1 to INT1_0/CNTR0 Input**	Disconnected	
R44	E8a	**Enables E8a Connection**	Do not remove a option resistor	R43, R45
R43	E8a	**Enables E8a Connection**	MUST be removed if R47 fitted	R43, R44, R47, R49
R45	E8a	**Enables E8a Connection**	MUST be removed if R49 fitted	R43, R44, R47, R49
R58	LCD Module	**Connects LCD_E**	Disconnected	
R59	Pin Function Select	**Connects microcontroller pin 38 to SEG25**	MUST be removed if R60 fitted	R60
R60	Pin Function Select	Connects microcontroller pin 38 to IO_7	**Should be removed if R59 fitted**	R59
R61	Pin Function Select	**Connects microcontroller pin 37 to SEG26**	MUST be removed if R62 fitted	R62
R62	Pin Function Select	Connects microcontroller pin 37 to IO_6	**Should be removed if R61 fitted**	R61
R63	Pin Function Select	**Connects microcontroller pin 36 to SEG27**	MUST be removed if R64 fitted	R64
R64	Pin Function Select	Connects microcontroller pin 36 to IO_5	**Should be removed if R63 fitted**	R63
R65	Pin Function Select	**Connects microcontroller pin 35 to SEG28**	MUST be removed if R66 fitted	R66
R66	Pin Function Select	Connects microcontroller pin 35 to IO_4	**Should be removed if R65 fitted**	R65
R67	Pin Function Select	**Connects microcontroller pin 34 to SEG29**	MUST be removed if R68 fitted	R68
R68	Pin Function Select	Connects microcontroller pin 34 to IO_3	**Should be removed if R67 fitted**	R67
R69	Pin Function Select	**Connects microcontroller pin 33 to SEG30**	MUST be removed if R70 fitted	R70
R70	Pin Function Select	Connects microcontroller pin 33 to IO_2	**Should be removed if R69 fitted**	R69
R71	Pin Function Select	**Connects microcontroller pin 32 to SEG31**	MUST be removed if R72 fitted	R72
R72	Pin Function Select	Connects microcontroller pin 32 to IO_1	**Should be removed if R71 fitted**	R71
R73	Pin Function Select	**Connects microcontroller pin 31 to SEG32**	MUST be removed if R74 fitted	R74
R74	Pin Function Select	Connects microcontroller pin 31 to IO_0	**Should be removed if R73 fitted**	R73

Table 6-10: Other option Links

6.7.Oscillator Sources

Crystal oscillator are fitted on the Renesas Starter Kit board and used to supply the main and sub clock input to the Renesas microcontroller. Table 6-11 details the oscillator that is fitted and alternative footprints provided on this Renesas Starter Kit:

Component		
Main clock (X1)	Fitted	12 MHz (HC/49U package)
Sub clock (X2)	Fitted	32.768 kHz (90SMX package)

Table 6-11: Oscillators

6.8.Reset Circuit

The CPU Board includes a simple latch circuit that links the mode selection and reset circuit. This provides an easy method for swapping the device between Boot Mode and Single chip mode. This circuit is not required on customers' boards as it is intended for providing easy evaluation of the operating modes of the device on the Renesas Starter Kit. Please refer to the hardware manual for more information on the requirements of the reset circuit.

The Reset circuit operates by latching the state of the boot switch on pressing the reset button. This control is subsequently used to modify the CNVss pin states as required.

The CNVss pin should change state only while the reset signal is active to avoid possible device damage.

The reset is held in the active state for a fixed period by a pair of resistors and a capacitor. Please check the reset requirements carefully to ensure the reset circuit on the customers' board meets all the reset timing requirements.

Chapter 7. Modes

The Renesas Starter Kit supports Boot mode and Single chip mode.

Details of programming the FLASH memory is described in the 38D5 Group Datasheet.

7.1. Boot mode

The boot mode settings for this Renesas Starter Kit are shown in Table 7-1: Boot Mode pin settings below:

CNVss	LSI State after Reset End
High	Boot Mode

Table 7-1: Boot Mode pin settings

The software supplied with this Renesas Starter Kit supports Boot mode using an E8a and High-performance Embedded Workshop only. However, hardware exists to enter boot mode manually, do not connect the E8a in this case. Press and hold the SW1/BOOT. The CNVss pin is held in its boot state while reset is pressed and released. Release the boot button. The BOOT LED will be illuminated to indicate that the microcontroller is in boot mode.

When neither the E8a is connected nor the board is placed in boot mode as above, the CNVss pin is pulled low by a 4.7k resistor.

When an E8a is used the CNVss pin is controlled by the E8a.

7.2. Single chip mode

Because the CNVss pin is pulled low, this Renesas Starter Kit will always boot in Single chip mode when the E8a is not connected and the boot switch is not depressed. Refer to 38D5 Group Datasheet for details of Single chip mode.

CNVss	LSI State after Reset End
Low	Single Chip Mode

Table 7-2: Single Chip Mode pin settings

Chapter 8. Programming Methods

The board is intended for use with High-performance Embedded Workshop and the supplied E8a debugger. Refer to 38D5 Group Datasheet for details of programming the microcontroller without using these tools.

Chapter 9. Headers

9.1. Microcontroller Headers

Table 9-1 to Table 9-4 show the microcontroller pin headers and their corresponding microcontroller connections. The header pins connect directly to the microcontroller pins.

J1					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	IO6_7	1	2	TRIGb	2
3	IO6_5	3	4	IRQ2	4
5	IO6_3	5	6	IRQ0	6
7	E8_CNVSS	7	8	RESn	8
9	CON_XCOUT	9	10	CON_XCIN	10
11	GROUND	11	12	CON_XIN	12
13	CON_XOUT	13	14	UC_VCC	14
15	PWM	15	16	TMR1	16
17	TMR0	17	18	V3	18
19	V2	19	20	IRQ1	20

Table 9-1: J1

J2					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	TRIGa	21	2	V1	22
3	COM1	23	4	COM2	24
5	COM3	25	6	COM4	26
7	SEG36	27	8	SEG35	28
9	SEG34	29	10	SEG33	30
11	IO_0/SEG32	31	12	IO_1/SEG31	32
13	IO_2/SEG30	33	14	IO_3/SEG29	34
15	IO_4/SEG28	35	16	IO_5/SEG27	36
17	IO_6/SEG26	37	18	IO_7/SEG25	38
19	SEG24	39	20	SEG23	40

Table 9-2: J2

J3					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	SEG22	41	2	SEG21	42
3	SEG20	43	4	SEG19	44
5	SEG18	45	6	SEG17	46
7	SEG16	47	8	SEG15	48
9	SEG14	49	10	SEG13	50
11	SEG12	51	12	SEG11	52
13	SEG10	53	14	SEG9	54
15	SEG8	55	16	SEG7	56
17	SEG6	57	18	SEG5	58
19	SEG4	59	20	SEG3	60

Table 9-3: J3

J4					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	SEG2	61	2	SEG1	62
3	CTS/RTS	63	4	SCIaCK	64
5	SCIaTX	65	6	SCIaRX	66
7	E8_BUSY	67	8	E8_SCLK	68
9	PTTX	69	10	PTRX	70
11	GROUND	71	12	CON_VREF	72
13	AD7	73	14	AD6	74
15	AD5	75	16	AD4	76
17	AD3	77	18	AD2	78
19	AD1	79	20	AD0	80

Table 9-4: J4

9.2. Application Headers

Table 9-5 and Table 9-6 below show the standard application header connections. * Marked pins are subject to option links.

JA1							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	Regulated Supply 1	CON_5V	-	2	Regulated Supply 1	GROUND	-
3	Regulated Supply 2	CON_3V3	-	4	Regulated Supply 2	GROUND	-
5	Analogue Supply	NC	-	6	Analogue Supply	NC	-
7	Analogue Reference	CON_VREF	72	8	ADTRG	NC	-
9	ADC0	AD0	80	10	ADC1	AD1	79
11	ADC2	AD2	78	12	ADC3	AD3	77
13	DAC0	NC	-	14	DAC1	NC	-
15	IOPort0	IO_0*	31	16	IOPort1	IO_1*	32
17	IOPort2	IO_2*	33	18	IOPort3	IO_3*	34
19	IOPort4	IO_4*	35	20	IOPort5	IO_5*	36
21	IOPort8	IO_6*	37	22	IOPort7	IO_7*	38
23	IRQ3	NC	-	24	I²C Bus (3rd pin)	NC	-
25	I²C Bus	NC	-	26	I²C Bus	NC	-

Table 9-5: JA1 Standard Generic Header

JA2							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	Reset	RESn	8	2	External Clock Input	CON_XIN	12
3	Interrupt	NC	-	4	Regulated Supply 1	GROUND	-
5	WDT overflow	NC	-	6	Serial Port	SCIaTX	65
7	Interrupt	IRQ0	6	8	Serial Port	SCIaRX	66
9	Interrupt	IRQ1	20	10	Serial Port	SCIaCK	64
11	Motor up/down	NC	-	12	Serial Port Handshake	CTS/RTS	63
13	Motor control	NC	-	14	Motor control	NC	-
15	Motor control	NC	-	16	Motor control	NC	-
17	Motor control	NC	-	18	Motor control	NC	-
19	Timer Output	TMR0	17	20	Timer Output	TMR1	16
21	Timer Input	TRIGa	21	22	Timer Input	TRIGb	2
23	Interrupt	IRQ2	4	24	Tristate Control	NC	-
25	SPARE	PWM	15	26	SPARE	CON_XOUT	13

Table 9-6: JA2 Standard Generic Header

Table 9-7 below show the LCD application header connections. * Marked pins are subject to option links.

JA4							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	V0	V1	22	2	V1	V2	19
3	V2	V3	18	4	V3	NC	-
5	GROUND	GROUND	-	6	GROUND	GROUND	-
7	COM1	COM1	23	8	COM2	COM2	24
9	COM3	COM3	25	10	COM4	COM4	26
11	SEG1	SEG1	62	12	SEG2	SEG2	61
13	SEG3	SEG3	60	14	SEG4	SEG4	59
15	SEG5	SEG5	58	16	SEG6	SEG6	57
17	SEG7	SEG7	56	18	SEG8	SEG8	55
19	SEG9	SEG9	54	20	SEG10	SEG10	53
21	SEG11	SEG11	52	22	SEG12	SEG12	51
23	SEG13	SEG13	50	24	SEG14	SEG14	49
25	SEG15	SEG15	48	26	SEG16	SEG16	47
27	SEG17	SEG17	46	28	SEG18	SEG18	45
29	SEG19	SEG19	44	30	SEG20	SEG20	43
31	SEG21	SEG21	42	32	SEG22	SEG22	41
33	SEG23	SEG23	40	34	SEG24	SEG24	39
35	SEG25	SEG25*	38	36	SEG26	SEG26*	37
37	SEG27	SEG27*	36	38	SEG28	SEG28*	35
39	SEG29	SEG29*	34	40	SEG30	SEG30*	33
41	SEG31	SEG31*	32	42	SEG32	SEG32*	31
43	SEG32	SEG33	30	44	SEG34	SEG34	29
45	SEG35	SEG35	28	46	SEG36	SEG36	27
47	SEG37	NC	-	48	SEG38	NC	-
49	SEG39	NC	-	50	SEG40	NC	-

Table 9-7: JA4 Optional Generic Header

Table 9-8and Table 9-9 below show the standard application header connections. * Marked pins are subject to option links.

JA5							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	ADC4	AD4	76	2	ADC5	AD5	75
3	ADC6	AD6	74	4	ADC6	AD7	73
5	CAN	NC	-	6	CAN	NC	-
7	CAN	NC	-	8	CAN	NC	-
9	Reserved	CON_XCIN	10	10	Reserved	CON_XCOUT	9
11	Reserved	NC	-	12	Reserved	NC	-
13	Reserved	NC	-	14	Reserved	NC	-
15	Reserved	NC	-	16	Reserved	NC	-
17	Reserved	NC	-	18	Reserved	NC	-
19	Reserved	NC	-	20	Reserved	NC	-
21	Reserved	NC	-	22	Reserved	NC	-
23	Reserved	NC	-	24	Reserved	NC	-

Table 9-8: JA5 Optional Generic Header

JA6								
Pin	Header Name		Circuit Net Name	Device Pin	Pin	Header Name		Circuit Net Name	Device Pin
1	DMA		NC	-	2	DMA		NC	-
3	DMA		NC	-	4	Standby (Open drain)		NC	-
5	Host Serial	SCIdTX	RS232TX	-	6	Host Serial	SCIdRX	RS232RX	-
7	Serial Port		NC	-	8	Serial Port		NC	-
9	Serial Port	Synchronous	NC	-	10	Serial Port		NC	-
11	Serial Port	Synchronous	NC	-	12	Serial Port	Synchronous	NC	-
13	Reserved		IO6_3	5	14	Reserved		IO6_5	3
15	Reserved		IO6_7	1	16	Reserved		NC	-
17	Reserved		NC	-	18	Reserved		NC	-
19	Reserved		NC	-	20	Reserved		NC	-
21	Reserved		NC	-	22	Reserved		NC	-
23	Reserved		NC	-	24	Reserved		NC	-

Table 9-9: JA6 Optional Generic Header

Chapter 10.Code Development

10.1. Overview

Note: For all code debugging using Renesas software tools, the Renesas Starter Kit board must be connected to a Personal Computer USB port via an E8a. An E8a is supplied with the Renesas Starter Kit product.

10.2. Mode Support

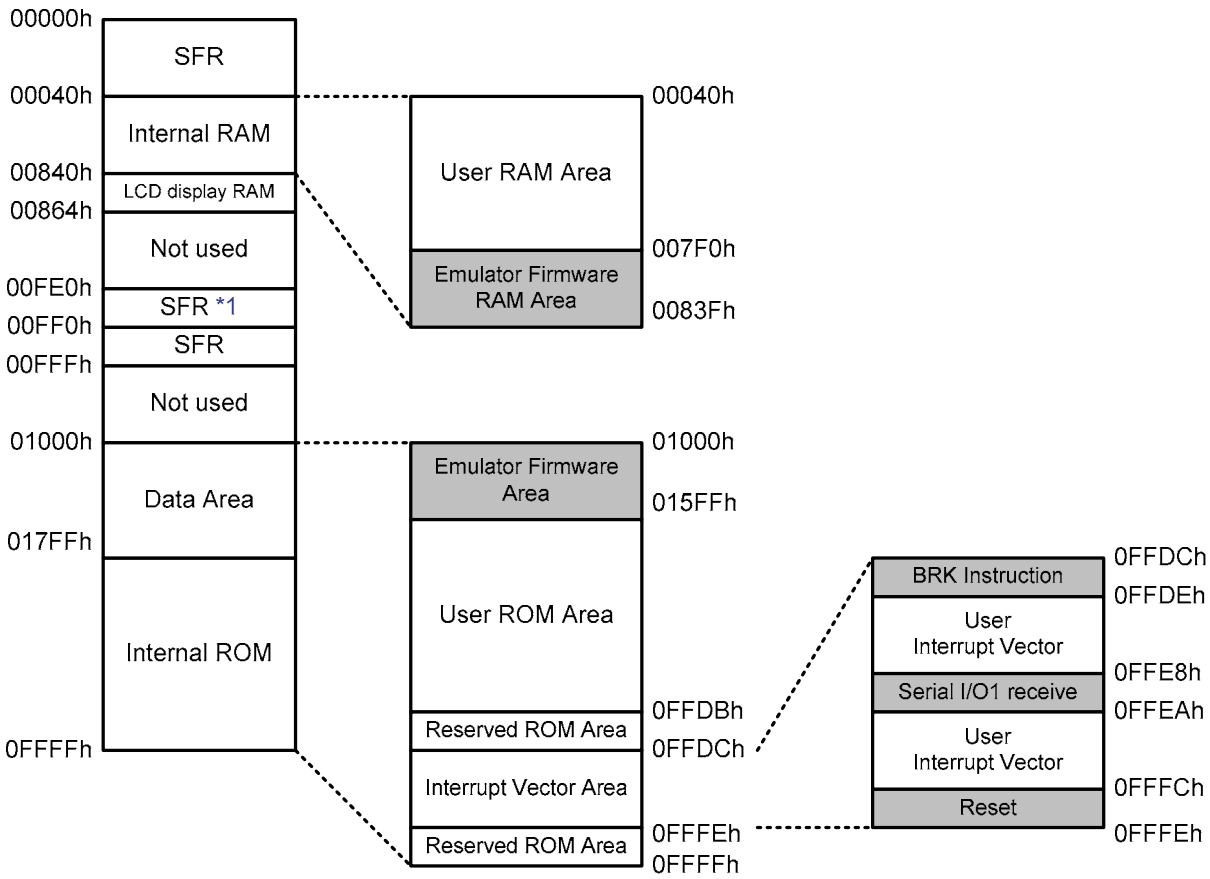
High-performance Embedded Workshop connects to the Microcontroller and programs it via the E8a. Mode support is handled transparently to the user.

10.3. Breakpoint Support

High-performance Embedded Workshop supports breakpoints on the user code, both in RAM and ROM.

Double clicking in the breakpoint column in the code sets the breakpoint. Breakpoints will remain unless they are double clicked to remove them.

10.4. Memory Map



*1: This area is available in the flash memory version only.

Figure 10-1: Memory Map

Chapter 11. Component Placement

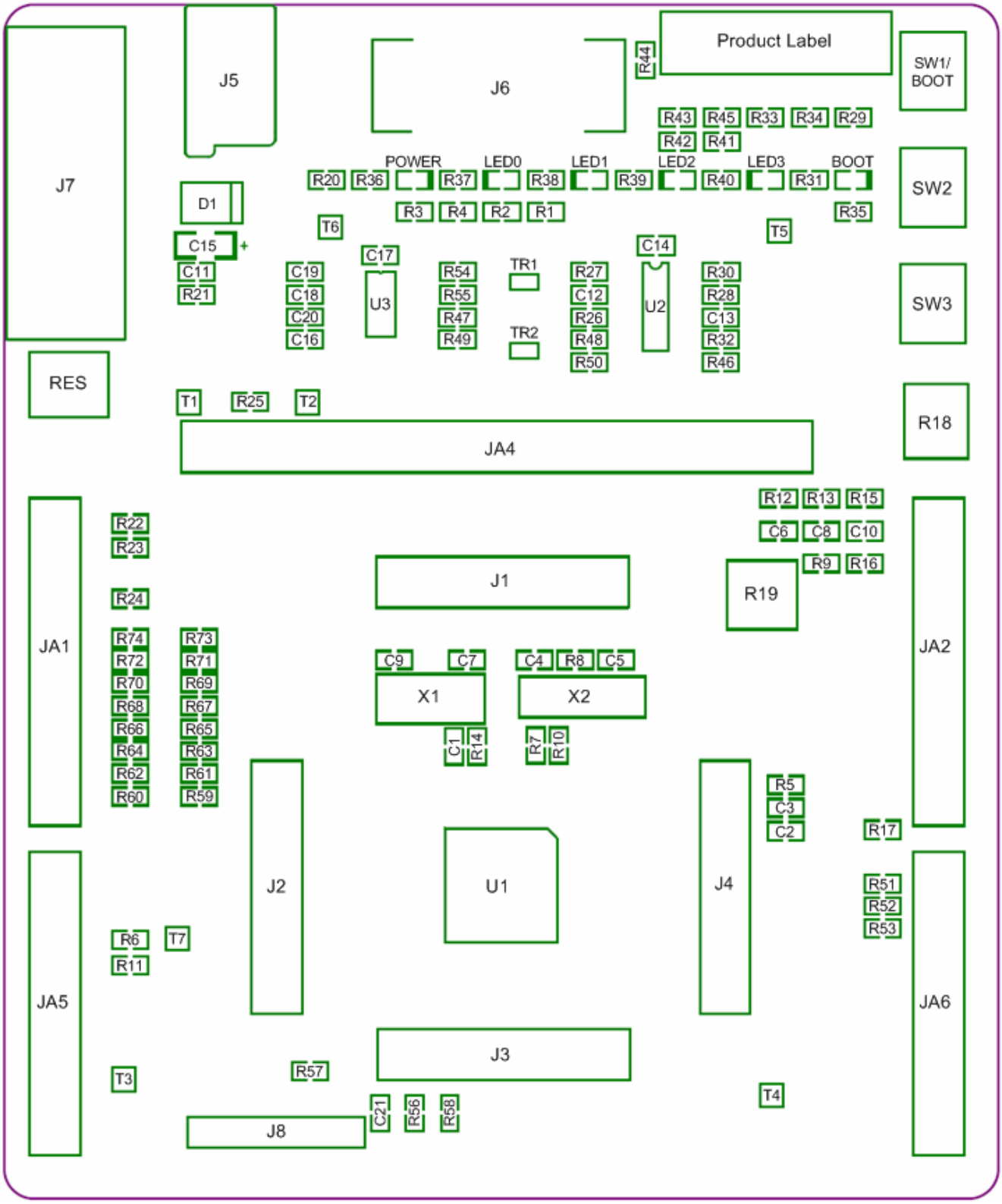


Figure 11-1: Component Placement

Chapter 12. Additional Information

For details on how to use High-performance Embedded Workshop, refer to the High-performance Embedded Workshop manual available on the CD or from the web site.

For information about the 38D5 group microcontrollers refer to the 38D5 Group Datasheet.

For information about the 38D5 assembly language, refer to the 740 Family Software Manual.

Online technical support and information is available at: http://www.renesas.com/renesas_starter_kits

Technical Contact Details

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General information on Renesas Microcontrollers can be found on the Renesas website at: http://www.renesas.com/.

Renesas Starter Kit for 38D5
User's Manual
Publication Date Rev.2.00 Aug.10,2007
Published by: Renesas Solutions Corp.
4-1-6, Miyahara, Yodogawa-ku, Osaka City, 532-0003, Japan

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Renesas Starter Kit for 38D5
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REJ10J1336-0200